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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/737,407 | 12/15/2000 | Benedict G. Pace | NH-07a | 8815 |

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| EXAMINER | |
|---|---|
| GUERRERO, MARIA F | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2822 | |

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/737,407 | PACE, BENEDICT G. | |
| | Examiner | Art Unit | |
| | Maria Guerrero | 2822 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *1-15 and 25-38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. This Office Action is in response to the Amendment filed December 22, 2003.

### Status of Claims

2. Claims 1-38 are pending.

### *Election/Restrictions*

3. Newly submitted claims 25-38 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claims require a specific way to deposit the metal and packaging on a ceramic base.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 25-38 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 16 and 19-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood et al. (U.S. 3,663,184).

Wood et al. teaches providing an insulating substrate having metallic pads, depositing a metal over the metallic pads (Fig. 1a-1d, col. 3, lines 14-60). Wood et al discloses the bumps comprising a metal having a melting point over 350°C and below the melting point of the metal forming the metallic pads (inherent) (col. 2, lines 10-15). Wood et al. teaches melting a metal on the metallic pads to form metal bumps (col. 2, lines 12-15). Furthermore, Wood et al. discloses the metallic pads having refractory metals and the bumps having gold (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10). Wood et al. teaches the use of copper as conventional in the art (col. 3, lines 67-70).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (U.S. 3,663,184) in view of Yamaji et al. (U.S. 6,159,837).

Regarding claims 17-18, Wood et al. does not specifically show the metal being in a powdered form and being deposited by screen-printing. However, Yamaji et al. teaches depositing the metal by screen-printing in a powdered form (col. 4, lines 20-25, col. 6, lines 3-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the conventional step of depositing the metal by screen-printing in a powdered form in Wood et al. reference as taught Yamaji et al. The modification would provide a highly reliable semiconductor device with reduce thermal stress (Yamaji et al., Abstract).

6. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (U.S. 3,663,184) in view of Kondo et al. (U.S. 5,656,858).

Regarding claims 23-24, Wood et al. does not specifically show coating the bumps with a barrier metal and the using a solder aid to enhance solderability. However, Kondo et al. teaches the bump being cover with a wiring pattern and being solder in order to be electrically connected to an external substrate (Fig. 1, col. 3, lines 40-45).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Wood et al. reference by including Kondo et al. teaching. The modification is proper because Wood et al. suggested the step of bonding to support substrates (col. 2, lines 54-58).

***Response to Arguments***

7. Applicant's arguments filed December 22, 2003 have been fully considered but they are not persuasive. Claims 16-24 stand rejected.

Applicant argued that Wood et al. shows that the bumps melt in the range of 182.8 °C to 329.4°C and Applicant's claim 16 and dependent claims 17-24 teach the

formation of solderable metal bumps by melting a metal having a melting point over 350oC. First, it is agreed that Wood et al. shows that the bumps melt in the range of 182.8 °C to 329.4°C. Second, claim 16 recites depositing a metal having a melting point over 350°C; melting the metal, forming metal bumps on the metallic pads. Third, Wood et al. shows depositing a metal on the substrate over the metallic pads, the metal having a metal point over 350°C., i.e., gold, and below the melting point of the metal forming the metallic pads, i.e. nickel (inherent) (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10). In addition, CRC Handbook of Chemistry and Physics (of record) is cited as evidence to show that the metal forming the bumps on Wood et al. have a lower melting point that the metallic pads.

Applicant argued that the gold layer on Wood et al. does not constituted a bump. However, the claims do not recite that the bumps being formed by a single metal. Claim 16 recites forming metal bumps on the metallic pads and Wood et al. anticipated that limitation (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10).

Furthermore, the elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the time of invention, but only that the subject matter is in fact inherent in the prior art reference. Schering Corp. v. Geneva Pharm. Inc., 339 F.3d 1373, 1377, 67 USPQ2d 1664, 1668 (Fed. Cir. 2003). Toro Co. v. Deere & Co., 355 F.3d 1313, 1320, 69 USPQ2d 1584, 1590 (Fed. Cir. 2004).

In addition, during patent examination, the pending claims must be "given *>their< broadest reasonable interpretation consistent with the specification." > In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. > In re American Academy of Science Tech Center, F.3d, 2004 WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation.) < This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., high temperature insulating materials) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. CRC Handbook of Chemistry and Physics (of record) is cited as evidence to show that the metal forming the bumps on Wood et al. have a lower melting point that the metallic pads. Hasegawa (U.S. 4,742,023) (of record) teaches the use of gold as the bump film material as well known in the art.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

February 11, 2005

María Guerrero

MARIA F. GUERRERO
PRIMARY EXAMINER